

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)	
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Makoto KITAMURA et al.)	Group Art Unit: Unassigned
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Application No.: Unassigned)	Examiner: Unassigned
)	
Filed: December 4, 2001)	
)	
For: Powder Supplying Apparatus...)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-captioned patent application, kindly enter the following amendment.

IN THE CLAIMS:

Kindly amend Claims 3, 4, 5, 6, 11, 14, 18, 19, 38, 39, 40, 44, 48, 52, 53, 56, 57, 58, 61, 62, 63 and 64, as follows.

3. A powder molding apparatus according to Claim 1, wherein said molded article holding means are configured so as to hold by engaging said molded article with a engaging piece provided on said die.

4. A powder molding apparatus according to Claim 1, wherein said molded article holding means are configured so as to hold by engaging said molded article with a guide member formed so as to encompass at least a part of said molded article.

5. A powder molding apparatus according to Claim 1, wherein said molded article holding means are configured so as to hold by pressing said molded article with a pressing mechanism.

6. A powder molding apparatus according to Claim 1, wherein said molded article holding means are configured so as to hold said molded article by pressure difference between fluid pressure and atmospheric pressure using a fluid pressure generating mechanism.

11. A powder molding apparatus according to Claim 8, further comprising depressurizing means for depressurizing by suctioning out air within said powder molding space, at said die or tapered block.

14. A powder molding apparatus according to Claim 11, wherein said depressurizing means are configured so as to start depressurizing at the point that powder is supplied to said powder molding space, and maintain the state of depressurization until at least compression molding is performed.

18. A powder molding apparatus according to Claim 16, wherein said sliding driving mechanism is configured so as to linearly drive said sliding claw.

19. A powder molding apparatus according to Claim 16, wherein said sliding driving mechanism is configured so as to rotationally drive said sliding claw.

38. A powder molding apparatus according to Claim 36, wherein said fixing means are introduced between said die and die set, and are configured of a fixing bush for causing taper fitting of said die and die set.

39. A powder molding apparatus according to Claim 36, wherein said fixing means are configured of an actuator which presses and fixes said die to said die set with a pressing member introduced therebetween.

40. A powder molding apparatus according to Claim 36, wherein said fixing means are introduced between said die and die set, and are configured of a fluid pressure fixing member which presses and fixes said die to said die set by pressurizing a pressure fluid filled therein.

44. A powder molding apparatus according to Claim 36, wherein said die set is configured so as to transport said mold between a powder supplying stage, a compressing molding stage, and a molded article extracting stage.

48. A powder molding apparatus according to Claim 46, wherein said die is disposed on a transporting table, and wherein said transporting table is configured so as to move between a powder supplying stage, a powder compressing stage, and a molded article extracting stage, in a direction orthogonal to the moving direction of said upper and lower punch units.

52. A powder molding apparatus according to Claim 49, wherein said upper end portion of said one driving shaft is linked to a upper mold supporting plate attached to said upper punch, so that said upper mold supporting plate is lowered with said one driving shaft while raising a lower mold supporting plate with said other driving shaft, by said driving sources, thereby effecting compression molding.

53. A powder molding apparatus according to Claim 49, wherein said driving shafts are ball screws axially supported by said base, and said driving sources are servo motors linked to said ball screws by timing belts.

56. A powder molding apparatus according to Claim 54, wherein respective ball screws are linked to said hollow outer cylinder and said inner cylinder, and wherein servo motors serving as driving sources are linked to said ball screws by timing belts.

57. A powder molding apparatus according to Claim 54, wherein said hollow outer cylinder is supported by a movable base, said inner cylinder is supported by a fixed base, and said die is disposed and fixed on a frame portion integrally extended from said fixed base.

58. A powder molding apparatus according to Claim 54, wherein said hollow outer cylinder and said inner cylinder are supported by a common movable base, said die is disposed and fixed on a transporting table provided separately from said movable base, and said transporting table is configured so as to move between a powder supplying stage, a powder compressing stage, and a molded article extracting stage.

61. A powder molding apparatus according to Claim 59, wherein said scraping blade is formed of a ceramic.

62. A powder molding apparatus according to Claim 59, wherein a powder supplying opening of said powder supplying tube is positioned so as to be offset outwards

from the center of said powder injecting hole, and also passes through the ceiling of said powder storing unit and is inserted to the inside thereof.

63. A powder molding apparatus according to Claim 59, wherein a tapered portion is formed at an edge of said powder injecting hole so as to fit with the blade tip of said scraping blade when closing off said powder injecting hole.

64. A powder molding apparatus according to Claim 59, wherein said scraping blade is provided independently from said powder storing unit, passes through a slit formed in said powder storing unit and extends into said powder storing unit, and is driven to perform scraping action by an actuator disposed outside said powder storing unit.

REMARKS

No new matter has been introduced.

The wording in Claims 3, 4, 5, 6, 11, 14, 18, 19, 38, 39, 40, 44, 48, 52, 53, 56, 57, 58, 61, 62, 63 and 64 have been amended to avoid multiple dependency.

Early and favorable consideration with respect to this application is respectfully requested.

These changes have been made in accordance with 37 C.F.R. § 1.121 as amended on November 7, 2000. Marked-up versions of Claims 3, 4, 5, 6, 11, 14, 18, 19, 38, 39, 40, 44, 48, 52, 53, 56, 57, 58, 61, 62, 63 and 64 indicating the changes is enclosed with this Preliminary Amendment.

Should any questions arise in connection with this application, the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

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Date: December 4, 2001

Attachment to Preliminary Amendment dated December 4, 2001

Marked-up Claims

3. A powder molding apparatus according to [either Claim 1 or 2] Claim 1, wherein said molded article holding means are configured so as to hold by engaging said molded article with a engaging piece provided on said die.

4. A powder molding apparatus according to [any of the Claims 1 through 3] Claim 1, wherein said molded article holding means are configured so as to hold by engaging said molded article with a guide member formed so as to encompass at least a part of said molded article.

5. A powder molding apparatus according to [any of the Claims 1 through 4] Claim 1, wherein said molded article holding means are configured so as to hold by pressing said molded article with a pressing mechanism.

6. A powder molding apparatus according to [any of the Claims 1 through 5] Claim 1, wherein said molded article holding means are configured so as to hold said molded article by pressure difference between fluid pressure and atmospheric pressure using a fluid pressure generating mechanism.

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Marked-up Claims

11. A powder molding apparatus according to [either Claim 8 or 9] Claim 8, further comprising depressurizing means for depressurizing by suctioning out air within said powder molding space, at said die or tapered block.

14. A powder molding apparatus according to [any of the Claims 11 through 13] Claim 11, wherein said depressurizing means are configured so as to start depressurizing at the point that powder is supplied to said powder molding space, and maintain the state of depressurization until at least compression molding is performed.

18. A powder molding apparatus according to [either Claim 16 or 17] Claim 16, wherein said sliding driving mechanism is configured so as to linearly drive said sliding claw.

19. A powder molding apparatus according to [either Claim 16 or 17] Claim 16, wherein said sliding driving mechanism is configured so as to rotationally drive said sliding claw.

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Marked-up Claims

38. A powder molding apparatus according to [either Claim 36 or 37] Claim 36, wherein said fixing means are introduced between said die and die set, and are configured of a fixing bush for causing taper fitting of said die and die set.

39. A powder molding apparatus according to [either Claim 36 or 37] Claim 36, wherein said fixing means are configured of an actuator which presses and fixes said die to said die set with a pressing member introduced therebetween.

40. A powder molding apparatus according to [either Claim 36 or 37] Claim 36, wherein said fixing means are introduced between said die and die set, and are configured of a fluid pressure fixing member which presses and fixes said die to said die set by pressurizing a pressure fluid filled therein.

44. A powder molding apparatus according to [any of the Claims 36 through 43] Claim 36, wherein said die set is configured so as to transport said mold between a powder supplying stage, a compressing molding stage, and a molded article extracting stage.

48. A powder molding apparatus according to [either Claim 46 or 47] Claim 46, wherein said die is disposed on a transporting table, and wherein said transporting table is

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Marked-up Claims

configured so as to move between a powder supplying stage, a powder compressing stage, and a molded article extracting stage, in a direction orthogonal to the moving direction of said upper and lower punch units.

52. A powder molding apparatus according to [any of the Claims 49 through 51] Claim 49, wherein said upper end portion of said one driving shaft is linked to a upper mold supporting plate attached to said upper punch, so that said upper mold supporting plate is lowered with said one driving shaft while raising a lower mold supporting plate with said other driving shaft, by said driving sources, thereby effecting compression molding.

53. A powder molding apparatus according to [any of the Claims 49 through 52] Claim 49, wherein said driving shafts are ball screws axially supported by said base, and said driving sources are servo motors linked to said ball screws by timing belts.

56. A powder molding apparatus according to [either Claim 54 or 55] Claim 54, wherein respective ball screws are linked to said hollow outer cylinder and said inner cylinder, and wherein servo motors serving as driving sources are linked to said ball screws by timing belts.

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Marked-up Claims

57. A powder molding apparatus according to [any of the Claims 54 through 56] Claim 54, wherein said hollow outer cylinder is supported by a movable base, said inner cylinder is supported by a fixed base, and said die is disposed and fixed on a frame portion integrally extended from said fixed base.

58. A powder molding apparatus according to [any of the Claims 54 through 56] Claim 54, wherein said hollow outer cylinder and said inner cylinder are supported by a common movable base, said die is disposed and fixed on a transporting table provided separately from said movable base, and said transporting table is configured so as to move between a powder supplying stage, a powder compressing stage, and a molded article extracting stage.

61. A powder molding apparatus according to [either Claim 59 or 60] Claim 59, wherein said scraping blade is formed of a ceramic.

62. A powder molding apparatus according to [any of the Claims 59 through 61] Claim 59, wherein a powder supplying opening of said powder supplying tube is positioned so as to be offset outwards from the center of said powder injecting hole, and also passes through the ceiling of said powder storing unit and is inserted to the inside thereof.

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Marked-up Claims

63. A powder molding apparatus according to [any of the Claims 59 through 62] Claim 59, wherein a tapered portion is formed at an edge of said powder injecting hole so as to fit with the blade tip of said scraping blade when closing off said powder injecting hole.

64. A powder molding apparatus according to [any of the Claims 59 through 63] Claim 59, wherein said scraping blade is provided independently from said powder storing unit, passes through a slit formed in said powder storing unit and extends into said powder storing unit, and is driven to perform scraping action by an actuator disposed outside said powder storing unit.